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Discussion of the Observations of the Sun made with the Washington Transit-Circle during the years 1875–1883 *inclusive.* By A. M. W. Downing, M.A.

The comparatively large discordances in existing determinations of the position of the equinox make it a matter of importance that the meridian observations of the Sun, made at the principal Observatories, should from time to time be discussed, and a determination of this element deduced from them. It is with this object in view that the discussion of the Washington Transit-Circle observations of the Sun made during the years 1875–1883 inclusive has been undertaken, and I have now the honour of communicating the results to the Society.

During the years mentioned the same reduction-elements have been used throughout, both for the observations of right ascension and of north polar distance. The adopted equinox is that of Newcomb's "Fundamental Equatorial Stars," used in the American *Ephemeris* since 1881. The observations of 1883 are the latest published.

The observations, as given in the several volumes of Washington Observations, have been combined by months, and the following table gives the mean day, the mean correction to the *Ephemeris* in R.A. and N.P.D. respectively, and the number of observations in each element on which the means depend. Those results only have been used which have been deduced from observations of *both* limbs of the Sun. The places of the Sun, with which the Washington observations were compared during these years, were taken from Hansen's and Olufsen's Solar Tables.

No.	Mean Date.	Correction to Ephemeris. R.A.	N.P.D.	Number of Observations. R.A.	N.P.D.
		s	"		
1	1875 Jan. 15	+0·063	+0·65	4	4
2	Feb. 15	+0·077	+0·60	7	7
3	Mar. 17	+0·039	+0·72	9	9
4	Apr. 17	−0·005	+1·14	6	6
5	May 20	−0·036	+1·29	11	11
6	June 18	−0·030	+1·68	8	8
7	July 14	+0·030	+0·80	2	2
8	Aug. 17	+0·065	+0·89	9	9
9	Sept. 12	+0·039	+2·04	7	7
10	Oct. 17	+0·110	+0·49	13	13
11	Nov. 14	+0·075	+0·62	10	9
12	Dec. 17	−0·089	+1·05	7	6
13	1876 Jan. 23	−0·050	+1·66	4	5
14	Feb. 16	+0·009	+0·55	9	11
15	Mar. 12	−0·023	+0·68	7	8
16	Apr. 13	+0·019	−0·18	11	10
17	May 15	−0·011	+1·10	7	9
18	June 17	−0·003	+1·01	7	7
19	July 16	−0·023	+0·98	13	13
20	Aug. 26	+0·087	+0·06	6	5
21	Sept. 16	+0·047	+0·25	6	6
22	Oct. 12	−0·016	−0·39	9	10
23	Nov. 10	+0·011	−0·10	8	9
24	Dec. 15	−0·058	−0·43	6	6
25	1877 Jan. 28	+0·063	+0·36	6	5
26	Feb. 13	+0·008	+1·44	10	10
27	Mar. 13	+0·050	+0·93	4	4
28	Apr. 11	+0·020	+0·68	4	5
29	May 14	−0·064	+1·97	5	6
30	June 16	−0·028	+1·80	5	6
31	July 18	−0·012	+2·02	5	5
32	Aug. 10	+0·150	+5·40	1	1
33	Oct. 9	+0·055	+0·45	2	2
34	Nov. 12	+0·064	−0·38	7	6
35	Dec. 13	+0·050	−0·85	3	4
36	1878 Feb. 15	−0·022	−0·52	6	6
37	Mar. 14	−0·017	−0·70	3	3
38	Apr. 14	−0·030	−1·30	8	8

No.	Mean Date.	Correction to Ephemeris. R.A.	Correction to Ephemeris. N.P.D.	Number of Observations. R.A.	Number of Observations. N.P.D.
		s	"		
39	1878 May 15	−0·022	+0·57	6	6
40	June 15	−0·050	+1·04	8	8
41	Sept. 20	−0·048	−0·61	6	7
42	Oct. 18	+0·050	+0·30	5	7
43	Nov. 12	+0·053	−1·17	9	9
44	Dec. 10	+0·030	+1·00	6	7
45	1879 Jan. 30*	+0·020	+2·30	1	1
46	Feb. 16	+0·082	+1·13	5	4
47	Mar. 6	+0·130	+0·05	4	4
48	Apr. 13	+0·010	+0·07	6	6
49	May 14	+0·053	+1·13	7	7
50	June 15	−0·009	+2·71	10	9
51	July 13	+0·019	+1·45	10	10
52	Aug. 13	0·000	+1·80	2	1
53	Sept. 17	+0·081	+1·78	7	8
54	Oct. 13	+0·166	+0·91	9	9
55	Nov. 17	+0·200	+1·72	5	5
56	Dec. 17	−0·010	+0·64	5	5
57	1880 Jan. 18	+0·040	+1·14	4	5
58	Feb. 14	−0·053	+0·42	6	5
59	Mar. 24	−0·053	+0·87	3	3
60	Apr. 19	−0·030	+1·20	4	4
61	May 16	−0·015	+2·06	10	8
62	June 18	+0·007	+1·70	3	1
63	July 20	+0·005	+2·85	4	4
64	Aug. 16	−0·033	+2·85	3	2
65	Sept. 16	−0·025	+2·50	8	5
66	Oct. 15	+0·032	+0·92	10	9
67	Nov. 15	+0·100	+2·57	3	3
68	Dec. 11	−0·023	+1·90	4	4
69	1881 Jan. 24	+0·095	−0·15	4	4
70	Feb. 16	+0·098	+1·59	9	9
71	Mar. 17	+0·010	+1·34	7	7
72	Apr. 22	−0·070	+0·78	5	6
73	May 24	−0·025	+1·63	6	6
74	June 20	−0·034	+1·87	7	7
75	July 15	−0·030	+1·87	11	12

* No. 45. An observation taken on 1879 Jan. 31, has been rejected.

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No.	Mean Date.	Correction to Ephemeris. R.A.	N.P.D.	Number of Observations. R.A.	N.P.D.
		s	″		
76	1881 Aug. 17	−0·037	+2·03	6	8
77	Sept. 24	+0·100	−0·20	1	1
78	Oct. 18	+0·003	+0·57	9	10
79	Nov. 17	+0·036	+1·26	7	7
80	Dec. 15	−0·015	+1·15	6	6
81	1882 Jan. 27	−0·030	+0·15	3	2
82	Feb. 13	+0·011	+0·46	11	11
83	Mar. 13	+0·013	+1·15	4	4
84	Apr. 20	−0·073	+0·13	8	8
85	May 19	−0·035	+0·64	10	9
86	June 15	−0·002	+0·71	12	12
87	July 16	+0·047	+0·08	6	6
88	Aug. 16	+0·020	−1·65	4	2
89	Sept. 21	−0·018	−0·26	5	5
90	Oct. 9	+0·010	+0·17	3	3
91	Nov. 19	+0·043	+0·22	6	5
92	Dec. 10	+0·023	−0·30	4	3
93	1883 Feb. 22	−0·020	+2·65	6	6
94	Mar. 11	+0·018	+2·44	5	5
95	Apr. 13	−0·013	+2·35	3	4
96	May 14	−0·014	+1·55	9	11
97	June 14	−0·022	+1·86	6	5
98	July 11	−0·004	+1·93	8	8
99	Aug. 12	−0·088	+1·54	6	5
100	Sept. 6	−0·160	+0·40	1	1
101	Oct. 19	+0·023	+1·70	6	6
102	Nov. 14	+0·029	+1·23	10	11
103	Dec. 13	−0·114	+1·16	7	8

The next step has been to compute the corrections to tabular Ecliptic North Polar Distance from the corrections to tabular R.A. and N.P.D. These form the absolute terms in the following equations of condition.

The weights have been computed in the following way. Let R and S be the factors by which the corrections to tabular R.A. and N.P.D. must respectively be multiplied to give correction to tabular E.N.P.D., so that

$$\delta \text{E.N.P.D.} = \text{R}\, \delta \text{R.A.} + \text{S}\, \delta \text{N.P.D.}$$

Now let n be the number of observations of R.A. in a group, e the probable error of a single observation of R.A., n_1 the

number of observations of N.P.D. in a group, e_1 the probable error of a single observation of N.P.D., then the weight of each correction to tabular Ecliptic North Polar Distance has been computed from the formula

$$\text{Weight} = \frac{nn_1}{10(n_1 R^2 e^2 + n S^2 e_1^2)}, \text{ or (if } n = n_1),$$

$$\text{Weight} = \frac{n}{10(R^2 e^2 + S^2 e_1^2)}.$$

For convenience the latter formula has been used, and where n and n_1 are not equal their mean has been taken as the value of n. The values of e and e_1 have been found for each month throughout the series of years by taking the difference between the mean correction to tabular R.A. or N.P.D., as the case may be, for the month in each year, and each individual correction. The following values for the probable errors for each month have been thus obtained, and the "adopted" values, not differing much from them, have been used in the subsequent computations.

Month.	Probable Error in R.A. Computed.	Probable Error in R.A. Adopted.	Number of Observations.	Probable Error in N.P.D. Computed.	Probable Error in N.P.D. Adopted.	Number of Observations.
	s	s		″	″	
January	±0·071	±0·070	25	±0·63	±0·85	25
February	·067	·070	69	·94	·85	68
March	·042	·045	46	·76	·85	47
April	·042	·045	55	·88	·85	55
May	·043	·045	69	·65	·65	73
June	·049	·045	68	·64	·65	62
July	·054	·045	62	·63	·65	60
August	·043	·045	36	·79	·65	31
September	·045	·045	40	·62	·65	39
October	·047	·045	70	·68	·65	70
November	·068	·070	62	·94	·85	58
December	·063	·070	49	·96	·85	43

In the formation of the following equations of condition it has been assumed that the error of tabular Ecliptic North Polar Distance may be represented by

$$x \times \cos \text{Sun's longitude} + y \times \sin \text{Sun's longitude} + z.$$

No.	Equations of Condition.					Weights.	Residuals.
				″			″
1	$+{\cdot}4260x$	$-{\cdot}9047y$	$+z$	$+0{\cdot}800$	$=0$	4·0	+0·330
2	$+{\cdot}8355x$	$-{\cdot}5495y$	$+z$	$+0{\cdot}948$	$=0$	3·8	+0·262
3	$+{\cdot}9984x$	$-{\cdot}0573y$	$+z$	$+0{\cdot}893$	$=0$	6·9	−0·055
4	$+{\cdot}8889x$	$+{\cdot}4581y$	$+z$	$+1{\cdot}037$	$=0$	5·1	−0·168
5	$+{\cdot}5115x$	$+{\cdot}8593y$	$+z$	$+1{\cdot}149$	$=0$	19·7	−0·211
6	$+{\cdot}0523x$	$+{\cdot}9986y$	$+z$	$+1{\cdot}671$	$=0$	20·0	+0·284
7	$-{\cdot}3711x$	$+{\cdot}9286y$	$+z$	$+0{\cdot}724$	$=0$	4·1	−0·588

No.	Equations of Condition.					Weights.	Residuals.
8	−·8124x	+·5831y	+z	+0″·524	=0	10·9	−0″·574
9	−·9833x	+·1822y	+z	+1·649	=0	6·8	+0·768
10	−·9141x	−·4054y	+z	−0·146	=0	13·9	−0·740
11	−·6163x	−·7875y	+z	+0·322	=0	7·2	−0·109
12	−·0799x	−·9968y	+z	+1·093	=0	9·3	+0·718
13	+·5461x	−·8377y	+z	+1·450	=0	3·8	+0·935
14	+·8428x	−·5383y	+z	+0·561	=0	5·0	−0·132
15	+·9914x	−·1305y	+z	+0·489	=0	5·8	−0·422
16	+·9128x	+·4083y	+z	−0·063	=0	8·8	−1·236
17	+·5714x	+·8207y	+z	+1·029	=0	13·2	−0·318
18	+·0561x	+·9984y	+z	+1·009	=0	17·5	−0·378
19	−·4136x	+·9104y	+z	+1·021	=0	26·0	−0·278
20	−·8967x	+·4425y	+z	−0·409	=0	6·1	−1·428
21	−·9948x	+·1022y	+z	−0·049	=0	5·8	−0·789
22	−·9414x	−·3374y	+z	−0·271	=0	9·8	−0·896
23	−·6602x	−·7511y	+z	−0·139	=0	6·0	−0·584
24	−·1019x	−·9948y	+z	−0·426	=0	8·3	−0·801
25	+·6289x	−·7775y	+z	+0·584	=0	4·0	+0·031
26	+·8209x	−·5712y	+z	+1·395	=0	5·5	+0·721
27	+·9931x	−·1175y	+z	+1·150	=0	3·1	+0·233
28	+·9278x	+·3730y	+z	+0·741	=0	3·7	−0·415
29	+·5885x	+·8085y	+z	+1·681	=0	8·9	+0·339
30	+·0770x	+·9970y	+z	+1·785	=0	12·5	+0·397
31	−·4399x	+·8980y	+z	+2·015	=0	9·6	+0·725
32	−·7443x	+·6678y	+z	+4·469	=0	1·8	+3·323
33	−·9588x	−·2840y	+z	+0·100	=0	2·0	−0·550
34	−·6365x	−·7713y	+z	−0·609	=0	4·7	−1·046
35	−·1415x	−·9899y	+z	−0·890	=0	4·8	−1·264
36	+·8380x	−·5456y	+z	−0·599	=0	3·2	−1·288
37	+·9946x	−·1042y	+z	−0·744	=0	2·3	−1·668
38	+·9092x	+·4163y	+z	−1·373	=0	6·7	−2·549
39	+·5781x	+·8160y	+z	+0·486	=0	9·8	−0·859
40	+·0976x	+·9952y	+z	+1·010	=0	17·0	−0·379
41	−·9991x	+·0422y	+z	−0·272	=0	6·2	−1·082
42	−·9048x	−·4258y	+z	+0·008	=0	6·5	−0·576
43	−·6399x	−·7685y	+z	−1·330	=0	6·5	−1·768
44	−·1982x	−·9802y	+z	+0·961	=0	8·4	+0·587
45	+·6490x	−·7608y	+z	+2·291	=0	0·7	+1·728
46	+·8449x	−·5348y	+z	+1·474	=0	2·4	+0·779
47	+·9692x	−·2462y	+z	+0·797	=0	3·2	−0·054

No.	Equations of Condition.					Weights.	Residuals.
48	$+\cdot 9181x$	$+\cdot 3963y$	$+z$	$+0''\cdot 120$	$=0$	5·1	$-1''\cdot 047$
49	$+\cdot 5955x$	$+\cdot 8033y$	$+z$	$+1\cdot 283$	$=0$	11·1	$-0\cdot 057$
50	$+\cdot 1022x$	$+\cdot 9948y$	$+z$	$+2\cdot 701$	$=0$	23·2	$+1\cdot 312$
51	$-\cdot 3557x$	$+\cdot 9346y$	$+z$	$+1\cdot 394$	$=0$	20·8	$+0\cdot 078$
52	$-\cdot 7711x$	$+\cdot 6368y$	$+z$	$+1\cdot 706$	$=0$	1·9	$+0\cdot 578$
53	$-\cdot 9952x$	$+\cdot 0982y$	$+z$	$+1\cdot 155$	$=0$	7·2	$+0\cdot 317$
54	$-\cdot 9400x$	$-\cdot 3412y$	$+z$	$-0\cdot 091$	$=0$	9·3	$-0\cdot 714$
55	$-\cdot 5738x$	$-\cdot 8190y$	$+z$	$+0\cdot 980$	$=0$	4·0	$+0\cdot 561$
56	$-\cdot 0799x$	$-\cdot 9968y$	$+z$	$+0\cdot 644$	$=0$	7·0	$+0\cdot 267$
57	$+\cdot 4697x$	$-\cdot 8828y$	$+z$	$+1\cdot 229$	$=0$	4·2	$+0\cdot 744$
58	$+\cdot 8231x$	$-\cdot 5678y$	$+z$	$+0\cdot 135$	$=0$	3·0	$-0\cdot 541$
59	$+\cdot 9970x$	$+\cdot 0770y$	$+z$	$+0\cdot 484$	$=0$	2·3	$-0\cdot 531$
60	$+\cdot 8663x$	$+\cdot 4995y$	$+z$	$+0\cdot 968$	$=0$	3·3	$-0\cdot 246$
61	$+\cdot 5575x$	$+\cdot 8302y$	$+z$	$+1\cdot 952$	$=0$	15·0	$+0\cdot 602$
62	$+\cdot 0398x$	$+\cdot 9992y$	$+z$	$+1\cdot 702$	$=0$	4·9	$+0\cdot 316$
63	$-\cdot 4731x$	$+\cdot 8810y$	$+z$	$+2\cdot 779$	$=0$	7·4	$+1\cdot 501$
64	$-\cdot 8100x$	$+\cdot 5864y$	$+z$	$+2\cdot 850$	$=0$	3·0	$+1\cdot 751$
65	$-\cdot 9948x$	$+\cdot 1022y$	$+z$	$+2\cdot 447$	$=0$	6·3	$+1\cdot 607$
66	$-\cdot 9227x$	$-\cdot 3856y$	$+z$	$+0\cdot 678$	$=0$	10·0	$+0\cdot 065$
67	$-\cdot 5915x$	$-\cdot 8063y$	$+z$	$+2\cdot 134$	$=0$	2·3	$+1\cdot 710$
68	$-\cdot 1722x$	$-\cdot 9851y$	$+z$	$+0\cdot 997$	$=0$	5·4	$+0\cdot 623$
69	$+\cdot 5721x$	$-\cdot 8202y$	$+z$	$+0\cdot 179$	$=0$	3·2	$-0\cdot 347$
70	$+\cdot 8499x$	$-\cdot 5270y$	$+z$	$+1\cdot 988$	$=0$	4·7	$+1\cdot 289$
71	$+\cdot 9988x$	$-\cdot 0483y$	$+z$	$+1\cdot 289$	$=0$	5·4	$+0\cdot 337$
72	$+\cdot 8420x$	$+\cdot 5395y$	$+z$	$+0\cdot 379$	$=0$	4·5	$-0\cdot 852$
73	$+\cdot 4452x$	$+\cdot 8955y$	$+z$	$+1\cdot 532$	$=0$	11·5	$+0\cdot 160$
74	$+\cdot 0105x$	$+\cdot 9999y$	$+z$	$+1\cdot 868$	$=0$	17·5	$+0\cdot 485$
75	$-\cdot 3945x$	$+\cdot 9189y$	$+z$	$+1\cdot 915$	$=0$	23·0	$+0\cdot 610$
76	$-\cdot 8175x$	$+\cdot 5760y$	$+z$	$+2\cdot 095$	$=0$	8·4	$+1\cdot 001$
77	$-\cdot 9995x$	$-\cdot 0302y$	$+z$	$-0\cdot 780$	$=0$	1·0	$-1\cdot 553$
78	$-\cdot 9031x$	$-\cdot 4295y$	$+z$	$+0\cdot 515$	$=0$	10·3	$-0\cdot 068$
79	$-\cdot 5664x$	$-\cdot 8241y$	$+z$	$+1\cdot 100$	$=0$	5·7	$+0\cdot 683$
80	$-\cdot 1063x$	$-\cdot 9943y$	$+z$	$+1\cdot 158$	$=0$	8·3	$+0\cdot 783$
81	$+\cdot 6115x$	$-\cdot 7912y$	$+z$	$+0\cdot 036$	$=0$	1·9	$-0\cdot 508$
82	$+\cdot 8183x$	$-\cdot 5748y$	$+z$	$+0\cdot 487$	$=0$	6·0	$-0\cdot 185$
83	$+\cdot 9926x$	$-\cdot 1216y$	$+z$	$+1\cdot 135$	$=0$	3·1	$+0\cdot 220$
84	$+\cdot 8619x$	$+\cdot 5070y$	$+z$	$+0\cdot 842$	$=0$	7·0	$-0\cdot 375$
85	$+\cdot 5220x$	$+\cdot 8529y$	$+z$	$+0\cdot 515$	$=0$	16·7	$-0\cdot 843$
86	$+\cdot 0976x$	$+\cdot 9952y$	$+z$	$+0\cdot 708$	$=0$	25·5	$-0\cdot 681$
87	$-\cdot 4062x$	$+\cdot 9138y$	$+z$	$-0\cdot 035$	$=0$	11·8	$-1\cdot 336$

No.	Equations of Condition.					Weights.	Residuals.
88	−·8052x	+·5930y	+z	−1″·655	= 0	3·7	−2″·758
89	−·9997x	+·0253y	+z	−0·131	= 0	4·8	−0·932
90	−·9600x	−·2801y	+z	+0·100	= 0	3·0	−0·552
91	−·5405x	−·8414y	+z	+0·075	= 0	4·7	−0·336
92	−·1982x	−·9802y	+z	−0·326	= 0	4·6	−0·700
93	+·8966x	−·4428y	+z	+2·365	= 0	8·0	+1·620
94	+·9870x	−·1607y	+z	+2·351	= 0	3·9	+1·466
95	+·9181x	+·3963y	+z	+2·110	= 0	2·9	+0·943
96	+·5955x	+·8033y	+z	+1·450	= 0	16·2	+0·110
97	+·1184x	+·9930y	+z	+1·840	= 0	13·5	+0·450
98	−·3242x	+·9460y	+z	+1·921	= 0	17·4	+0·596
99	−·7606x	+·6492y	+z	+1·861	= 0	7·1	+0·726
100	−·9596x	+·2812y	+z	+1·287	= 0	1·0	+0·354
101	−·8994x	−·4371y	+z	+1·461	= 0	6·5	+0·882
102	−·6166x	−·7873y	+z	+1·080	= 0	8·1	+0·649
103	−·1507x	−·9886y	+z	+1·262	= 0	10·1	+0·888

Proceeding to solve these by the method of least squares, I find the normal equations:

$$+313{\cdot}0289x + 43{\cdot}8237y - 23{\cdot}1768z + 30''{\cdot}924 = 0$$
$$+43{\cdot}8237x + 495{\cdot}4996y + 237{\cdot}5829z + 461{\cdot}675 = 0$$
$$-23{\cdot}1768x + 237{\cdot}5829y + 809{\cdot}0z + 830{\cdot}524 = 0$$

whence

$x = -0''{\cdot}0941$ with weight 306·3438
$y = -0{\cdot}5003$ „ 417·5209
$z = -0{\cdot}8824$ „ 688·7679

These values of x, y, and z have been substituted in the equations of condition, and the residuals (given in the last column above) formed. From them I find that the probable error of a determination of correction to tabular Ecliptic North Polar Distance of weight unity (on the assumption made in the formation of the equations of condition) is $\pm 1''{\cdot}5512$, and therefore

Probable error of $x = \pm 0''{\cdot}0886$
„ $y = \pm 0{\cdot}0759$
„ $z = \pm 0{\cdot}0591$

The above value of x indicates that, at the first point of *Aries*, the assumed ecliptic is north of the Sun's true path by $0''{\cdot}0941$, and therefore that the correction to the assumed (Newcomb's) system of right ascensions is

$$\frac{-0^s{\cdot}0941}{15 \sin 23^\circ 27'} = -0^s{\cdot}0158 \pm 0^s{\cdot}0148.$$

The value of y indicates that the obliquity assumed in Hansen's and Olufsen's Tables ought to be diminished by $0''\cdot5003$.

The value of z shows that the mean of the observed distances from the pole to the ecliptic is too great by $0''\cdot8824$.

The corrections to the principal systems of right ascensions resulting from this discussion of Washington observations of the Sun are as follows:—

		s
Washington (1875–1883)	– American Ephemeris (Newcomb)	= –0·016
	– Berliner Jahrbuch (Auwers)	= 0·000
	– Greenwich (1880)	= +0·026
	– Pulkowa (1845)	= +0·003
	– Pulkowa (1865)	= –0·052
	– Conn. des Temps (1883)	= +0·029

Blackheath: July 1889.

Preliminary Spectroscopic Survey of Southern Stars, made at the Melbourne Observatory with a Maclean direct-vision Spectroscope on the 8-*inch Equatorial.*

(*Communicated by R. L. J. Ellery.*)

This survey is a rough reconnaissance preliminary to a more thorough examination of the spectra of southern stars it is intended to make by aid of the 4-foot reflector, and higher power spectroscopes. The list contains a hundred stars examined to the present time. The star-places are brought up to the epoch 1890, and the descriptions are copied from the actual notes taken at the time by Mr. P. Baracchi, assistant, who made the observations.

The "Maclean Spectroscope" while transmitting a maximum of light has low power, and, except in the case of red stars, is insufficient for stars below the 5th magnitude. For this reason, in the spectra of many stars of the 4th and 5th magnitude of Class II. (a) (Vogel Classification) no dark lines could be seen with certainty, and these are entered as having a continuous spectrum, while there can be little doubt fine dark lines will be seen with higher spectroscopic power. The Fraunhofer lines are freely made use of in the description, more for the sake of brevity than any pretension to accurate location of the features seen in the spectrum.

It is, however, hoped that even in this preliminary form the survey, when completed, will be of great use in mapping out theoretical outlines concerning the spectra of the southern stars, also in facilitating the spectroscopic work to be done with the great telescope, and, probably the most important of all, the detection of red stars.